

Patent Claims

1. Automatic sample collector (1) for liquids having
 - a collection container (3) or a plurality of collection containers (3) arranged in series which are connected to a supply line (2) through a liquid inlet (6),
 - a supply line (2) between the liquid inlets (6) of adjacent collection containers (3) with a liquid barrier (4) that is gas-permeable in dry condition and becomes permeable for liquids after a defined pressure difference is exceeded, and
 - an integrated apparatus that prevents the additional inflow to the collection container (3) through the liquid inlet (6) after the associated collection container (3) has been filled.

2. Automatic sample collector (1) in accordance with Claim 1, characterized in that
 - the apparatus that prevents the inflow to the collection container (3) through the liquid inlet (6) after the collection container (3) has been filled is developed as gas-permeable liquid barrier (5) and that the collapse of said liquid barrier (5) requires a greater pressure difference than the collapse of the liquid barrier (4), and
 - the gas-permeable liquid barrier (5) is connected directly to the atmosphere or is integrated into a gas discharge (7).

3. Automatic sample collector (1) in accordance with Claim 1 or 2, characterized in that each collection container (3) is connected to the supply line (2) by the liquid inlet (6) and an additional downstream gas discharge (7) in the direction of flow which is closed to the outside, and the liquid barrier (4) is arranged between the liquid inlet (6) and the gas discharge (7) of the collection container (3).
4. Automatic sample collector (1) in accordance with one of the claims 1 or 2, characterized in that the collection container (3) is connected to a gas discharge (7) that is not connected to the supply line (2) but rather in another way to the atmosphere or another larger closed space.
5. Automatic sample collector (1) according to at least one of the claims 1 to 4, characterized in that the supply line (2) and/or the collection containers (3) are integrated in a solid matter body.
6. Automatic sample collector (1) in accordance with at least one of the claims 1 to 5, characterized in that it is comprised exclusively of autoclavable materials.
7. Automatic sample collector (1) in accordance with at least one of the claims 1 to 6, characterized in that

the collection containers (3) can be detached from the supply line (2).

8. Automatic sample collector (1) in accordance with at least one of the claims 1 to 7, characterized in that a delivery apparatus (8) in form of a pump or suction apparatus is integrated in the supply line (2).
9. Automatic sample collector (1) in accordance with at least one of the claims 1 to 8, characterized in that a valve (9) is integrated in the supply line (2).
10. Automatic sample collector (1) in accordance with at least one of the claims 1 to 9, characterized in that the supply line (2) comprises a pressure sensor (10).
11. Automatic sample collector (1) in accordance with at least one of the claims 8 to 10, characterized in that a control is arranged for the delivery apparatus (8) or the valve (9).
12. Automatic sample collector (1) in accordance with at least one of the claims 1 to 11, characterized in that its gas-filled cavities contain a protective gas such as nitrogen, argon or the like.
13. Automatic sample collector (1) in accordance with at least one of the claims 1 to 12,

characterized in that
a cooling apparatus, preferably a Peltier cooling
apparatus, for the collection containers is integrated
in the sample collector.

14. Automatic sample collector (1) in accordance with at least one of the claims 1 or 13,
characterized in that
an apparatus that prevents the flow in the liquid inlet (6) after the filling the collection container (3) is developed as cryostat which maintains the temperature of the liquid in the supply line (2) above the freezing point and the temperature in the collection containers (3) below the freezing point of the liquid to be collected.
15. Method for the removal of one or a plurality of samples of a liquid from a flow of liquid, where
- the liquid is guided in a supply line (2) of a sample collector (1) to a gas-permeable liquid barrier and a liquid inlet (6) that branches off from the supply line (2) upstream of the gas-permeable liquid barrier (4) and runs into a collection container (3),
 - said liquid is then filled into the collection container (3) through the liquid inlet (6),
 - then the feed-in of the liquid through the liquid inlet (6) is interrupted, whereupon
 - the liquid barrier (4) is permeated and
 - the liquid continues to flow through the supply line (2).

16. Method in accordance with claim 15,
characterized in that
- the pressure difference between the liquid in the supply line (2) and a reference pressure is measured and
 - the increase of pressure in the supply line (2) after filling a sample container (3) or the decrease of said pressure after collapse of the liquid barrier (4) is used as a signal to interrupt the feed-in of the liquid in the supply line (2) with the help of a valve (9), a controllable pump or the like.
17. Method in accordance with claim 16,
characterized in that
after interruption, the feed-in of liquid is resumed automatically or manually at a defined time by the controlling a valve (9) or a delivery apparatus (8).
18. Use of an automatic sample collector in accordance with at least one of the claims 1 to 14 and a method in accordance with one of the claims 15 to 17 for the chronological deposit of liquid samples from a flow of liquid without using movable parts and without external energy source.
19. Use of an automatic sample collector (1) in accordance with at least one of the claims 1 to 14 and a method in accordance with one of the claims 15 to 17 for the chronological deposit of liquid fractions under water or in a protective gas atmosphere.

20. Use of an automatic sample collector (1) in accordance with claim 14 and the method in accordance with claim 15 for the chronological freezing of liquid samples.
21. Use of an automatic sample collector (1) in accordance with at least one of the claims 18 to 20 to deposit liquid fractions from a chromatography column, an electrophoresis apparatus, a reaction container, a culture container, a fermenter, a body of water, the ground of a body of water, the ground, a vegetable, animal or human tissue or organ or the like.